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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/589,724	08/17/2006	Yasuhiro Shimada	067471-0123	9514

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EXAMINER	
ELEY, JESSICA L	

ART UNIT	PAPER NUMBER
2884	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/589,724	SHIMADA ET AL.	
	Examiner	**Art Unit**	
	JESSICA L. ELEY	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _17 August 2006_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _25-49_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _25-49_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _17 August 2006_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _17 August 2006_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 25-28 and 46 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamada et al. US 6,326,621 B1 (henceforth referred to as Kamada).

Regarding **claim 25**, Kamada teaches a manufacturing method for an infrared detection device including a thermal resistance element (resistive bolometer) in which a thermal resistor substance whose resistance changes according to temperature contacts an electrode (column 2 lines 24-32), the manufacturing method comprising:

An electrode formation step of forming the electrode **202** in a predetermined shape on a substrate (column 6 lines 44-46); and

A growth step of selectively growing the thermal resistor substance **206** on only the electrode (column 6 lines 65-67).

Regarding **claim 26**, Kamada teaches a manufacturing method for an infrared detection device including a thermal resistance element in which a thermal resistor substance whose resistance changes according to temperature contacts an electrode, the manufacturing method comprising:

An electrode formation step of forming the electrode on a semiconductor substrate (column 6 lines 44-46, FIG. 4a);

A thin film formation step of forming a thin film **203** on the electrode (column 6 lines 54-57, FIG. 4b);

A thin film removal step of removing a portion of the thin film to expose the electrode (column 6 lines 54-57, FIG. 4c);

A growth step of growing the thermal resistor substance and the exposed electrode (column 6 lines 65-67, FIG.4d); and

A step of forming a conductive film on the thin film and on the thermal resistor substance (column 7 lines 17-23, FIG.4f).

Regarding **claims 27 and 28**, Kamada teaches the growth step being RF magnetron sputtering. As can be seen from FIG. 4d the thermal resistor substance **206** is selectively grown on only the electrode **202** by a vapor growth method, in this case RF magnetron sputtering (column 6 lines 65-67).

Regarding **claim 46** Kamada teaches an infrared detection device **230** including a thermal resistance element in which a thermal resistor substance whose resistance changes according to temperature contacts an electrode, wherein

The thermal resistor substance has been selectively formed on only the electrode that was formed on a substrate (FIG. 4d).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 29 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada et al. US 6,326,621 B1 (henceforth referred to as Kamada) as applied to claims 25 and 26, and further in view of Watton et al. US 6,388,256 B1 (henceforth referred to as Watton).

Regarding **claims 29 and 30**, Kamada teaches a manufacturing method as described in claims 25 and 26. Kamada uses RF magnetron sputtering as the step for growing the thermal resistor substance. Kamada does not specifically detail the alternative method of growth using metal-organic chemical vapor deposition (MOCVD); however such an alternative is known in the art. Watton teaches that ferroelectric materials may be deposited by various techniques including rf magnetron sputtering and MOCVD (column 1 lines 64-66). It would be obvious to one of ordinary skill in the art at the time the invention was made to grow the ferroelectric layer of the ferroelectric bolometer taught by Kamada by MOCVD as taught by Watton since a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp which Watton shows is the case.

Claims 31, 32, 39, 40, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada et al. US 6,326,621 B1 (henceforth referred to as Kamada), and "Sputter Deposition" by N. M. Williams, J. J. Cuomo, Published online: 27 December, 1999 (henceforth referred to as Williams).

Regarding **claims 31 and 32**, Kamada teaches the manufacturing method of claims 27 and 28, wherein the growth step is achieved by RF magnetron sputtering (column 6 lines 65-67). Kamada however does not teach the detailed steps involved with RF magnetron sputtering. In the article by Williams the details of fabrication through sputtering are described. Williams teaches the growth steps including:

a vaporization step of vaporizing a composition material of the thermal resistor substance into a gaseous material (page 304, fourth full paragraph);

an ion clusterization step of ion clusterizing the gaseous material (page 304, fourth full paragraph);

a collection step of collecting the ion clusterized gaseous material on the electrode by giving the electrode a predetermined electric potential to generate an electric field (page 305, second and fifth full paragraphs); and

a condensation step of causing the ion clusterized gaseous material to condense on the electrode by hearing the electrode to a predetermined temperature, to grow the thermal resistor substance (page 305, tenth paragraph).

It would be obvious to one of ordinary skill in the art at the time the invention was made to use the details taught by Williams in order to achieve the manufacturing method taught by Kamada since Kamada directly teaches using RF magnetron sputtering which is what is described by Williams.

Regarding **claims 39, 40 and 47**, Kamada teaches the manufacturing method of claims 25 and 26, and the device of claim 46 but does not specifically address the relation of the crystal lattice constant of the electrode with the thermal resistor substance. However it is known in the art that the crystal lattice constant of the layers should match as closely as possible in order to prevent any stress in these layers. Williams highlights this issue (page 306 first paragraph). Thus, it would be obvious for one of ordinary skill in the art at the time the invention was made to equal the crystal lattice constant of the electrode with the thermal resistor substance when applying the sputtering method directly taught by Kamada since Williams teaches that “Stress may also occur when there is a large mismatch between the lattice parameters of the substrate

and film material," the substrate in the case of Kamada is the electrode layer, and the film material is the thermal resistor substance as in claims 25 and 26.

Claims 33-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada et al. US 6,326,621 B1 (henceforth referred to as Kamada) as applied to claims 25 and 26 above, and further in view of Sher et al. US 5,017,784 (henceforth referred to as Sher).

Regarding **claims 33-36**, Kamada teaches the manufacturing method of claims 27 and 28, wherein the growth step highlighted is RF magnetron sputtering (column 6 lines 65-67). However, other method of growing a thermal resistor substance are known in the art. Sher for example teaches growing the thermal resistance substance by electrophoresis (column 3 lines 37-40). It would be obvious to one of ordinary skill in the art at the time the invention was made to pursue the known options in the art for manufacture of a thermal detector, one of the options being electrophoresis as taught by Sher.

Regarding **claims 37 and 38**, Kamada teaches the manufacturing method of claims 27 and 28, wherein the growth step highlighted is RF magnetron sputtering (column 6 lines 65-67). However, other method of growing a thermal resistor substance are known in the art. Sher for example teaches growing the thermal resistance substance by electrophoresis (column 3 lines 37-40). Furthermore the method of manufacture taught by Sher includes:

A colloidization step of colloidizing a composition material of the thermal resistor substance into colloid particles, i.e. dispersant (column 3 lines 26-39);

A suspension generation step of generating a suspension including the colloid particles (column 3 lines 26-39);

An electric field generation step of, with the semiconductor substrate being immersed in the suspension, applying a predetermined voltage to the electrode to generate an electric field (column 5 lines 7-17); and

An aggregation step of causing the colloid particles to aggregate on the electrode by an action of the electric field, to grow the thermal resistor substance (column 5 lines 7-17).

It would be obvious to one of ordinary skill in the art at the time the invention was made to pursue the known options in the art for manufacture of a thermal detector, one of the options being electrophoresis as taught by Sher.

Claims 41, 42, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada et al. US 6,326,621 B1 (henceforth referred to as Kamada) as applied to claims 25 and 26 above, and further in view of Tsuchiya et al. US 2002/0139776 A1 (henceforth referred to as Tsuchiya).

Regarding **claims 41, 42, and 48**, Kamada teaches the method and device of parent claims 25, 26, and 46. Kamada does not teach the material of the thermal resistor substance being a strongly correlated electron material expressed by the general formula $PR_xCa_{1-x}MnO_3$, to which a metal oxide, having a perovskite structure and including an alkaline-earth metal or a rare-earth metal, has been added. Tsuchiya teaches a bolometer whose thermal resistor material is made from a perovskite type Mn oxide (¶0075) with the rare earth metal Pr and an alkali metal Ca (¶0078). It would be obvious to one of ordinary skill in the art at the time the invention was made to use the material taught by Tsuchiya as the thermal resistor substance in the bolometer

taught by Kamada since Tsuchiya teaches that this material achieves higher sensitivity than the traditional materials (¶0011-¶0012).

Claims 43-45, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamada et al. US 6,326,621 B1 (henceforth referred to as Kamada).

Regarding **claim 43**, Kamada teaches the manufacturing method as applied to claim 26 above. Furthermore Kamada teaches another embodiment where the thin-film is an insulation film **105**. It would be obvious to a person of ordinary skill in the art at the time the invention was made to use the insulation film shown in FIG. 2e as the thin film for the detector **230** as it applied to claim 26, since this film is produced using the same manufacturing method, RF magnetron sputtering, and is used as the base for the resistor film of a bolometer, thus providing one of ordinary skill in the art a reason to pursue the known options within his or her technical grasp.

Regarding **claims 44, 45, and 49**, Kamada teaches the manufacturing method as applied to claims 25 and 26, and the device as applied to claim 46, above. Furthermore Kamada teaches the thermal resistor substance being formed by sputtering (TABLE 7). It would be obvious to a person of ordinary skill in the art at the time the invention was made that by forming the resistive substance under the conditions described in Table 7 the thermal substance would form a single crystal; This is further evidenced by the representation of this layer by FIG. 4d-4g.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSICA L. ELEY whose telephone number is (571)272-9793. The examiner can normally be reached on Monday - Thursday 8:00-6:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dave Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. L. E./
Examiner, Art Unit 2884
/David P. Porta/
Supervisory Patent Examiner, Art Unit 2884